EPL 2018 vol.121 N4

Aftershocks following crash of currency exchange rate: The case of RUB/USD in 2014

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© CopyrightEPLA, 2018. The dynamical behavior of the currency exchange rate after its large-scale catastrophe is discussed through a case study of the rate of Russian rubles to US dollars after its crash in 2014. It is shown that, similarly to the case of the stock market crash, the relaxation is characterized by a power law, which is in analogy with the Omori-Utsu law for earthquake aftershocks. The waiting-time distribution is found to also obey a power law. Furthermore, the event-event correlation is discussed, and the aging phenomenon and scaling property are observed. Comments are made on (non-)Markovianity of the aftershock process and on a possible relevance of glassy dynamics to the market system after the crash.

http://dx.doi.org/10.1209/0295-5075/121/48001

References

[1] Gutenberg B. and Richter C. F. 1954 Seismicity of the Earth and Associated Phenomenon 2nd edition (Princeton: Princeton University Press)

[2] Turcotte D. L. 1997 Fractals and Chaos in Geology and Geophysics 2nd edition (Cambridge: Cambridge University Press)

[3] Omori F. 1894 J. Coll. Sci. Imp. Univ. Tokyo 7 111

[4] Utsu T. 1961 Geophys. Mag. 30 521

[5] Matia K., Amaral L. A. N., Goodwin S. P. and Stanley H. E. e-print arXiv:cond-mat/0202028

[6] Lillo F. and Mantegna R. N. 2003 Phys. Rev. E 68 016119

[7] Abe S. and Suzuki N. 2003 Physica A 319 552

[8] Abe S. and Suzuki N. 2003 Europhys. Lett. 61 852

[9] Mantegna R. N. and Stanley H. E. 2000 An Introduction to Econophysics: Correlations and Complexity in Finance (Cambridge: Cambridge University Press)

[10] Bouchaud J.-P. and Potters M. 2009 Theory of Financial Risk and Derivative Pricing: From Statistical Physics to Risk Management 2nd edition (Cambridge: Cambridge University Press)

[11] Abe S. and Suzuki N. 2005 Physica A 350 588

[12] Abe S. and Suzuki N. 2009 Physica A 388 1917

[13] Abe S. and Suzuki N. 2004 Physica A 332 533

[14] Abe S. and Suzuki N. 2012 Acta Geophys. 60 547

[15] Bouchaud J.-P. 1992 J. Phys. I 2 1705

[16] Wales D. J. 2003 Energy Landscapes: With Applications to Clusters, Biomolecules and Glasses (Cambridge: Cambridge University Press)

[17] Barndorff-Nielsen O. E., Benth F. E. and Jensen J. L. 2000 Adv. Appl. Probab. 32 779

[18] Bardou F., Bouchaud J.-P., Aspect A. and Cohen-Tannoudji C. 2002 Lévy Statistics and Lase Cooling: How Rare Events Bring Atoms to Rest (Cambridge: Cambridge University Press)